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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Harish Viswanathan

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10/12/2006

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EXAMINER

GHEBRETINSAE, TEMESGHEN

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/955,368

Applicant(s)

VISWANATHAN, HARISH

Examiner

Temesghen Ghebretinsae

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 20-22 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

### Response to Arguments

2. In response to applicant's argument regarding the Restriction requirement. Applicant argues that the restriction requirement should be withdrawn for at least the reason(s) that the search for either group would include searching "wherein each transmit sequence of a particular transmit-sequence chain is a function of symbol of one of the symbol sub-streams of the respective symbol sub-stream pair and a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair". However, examiner disagrees with applicant because group II also includes additional limitation "*receiver comprising: at least one receive antenna; and a matrix multiplier for multiplying a matrix with received symbol sub-streams of a signal received by the receive antenna, the matrix having at least two pairs of consecutive rows, each such pair being a function of channel characteristics of at least two channels that terminate on the receive antenna but not of channel characteristics of other channels that terminate on the receive antenna, and the matrix being orthogonal*" which is not claimed in group I.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylitalo et al (6,788,661) in view of Boariu et al (6,865,237) or Dabak et al (6,594,473).

Consider claims 1,6-8,10,14,17-19,Ylitalo discloses a transmitter adapted to transmit at least two sub streams, the transmitter comprising: a space time encoder (10) adapted to space time code at least two pairs of symbol sub-streams, each of the pairs of symbol stream being space time coded to from a respective pair of the transmit sequence chains, the space time coding being such that at least one of the formed pairs of the transmit-sequence chains is a function of symbols of the respective pair of symbol sub-streams and not a function of the symbols of the other pairs of the symbol sub-streams; wherein each transmit sequence of the particular transmit-sequence chain is a function of 1) a symbol of one of the symbol sub-streams of the respective symbol-sub stream pair and 2) a complex conjugate of a symbol of the other symbol sub-stream of the respective symbol sub-stream pair; a plurality of radio frequency; and at least two transmit antenna, each having an input for receiving at least one of the at least two transit-sequence chains. (See fig. 2.4.5, col.2, lines 14-53; col.4, line 51 to col.5, line 57)

Ylitalo differs from the present claimed invention in that he only discloses at least two transmit antennas and thus only discloses two symbol sub-streams. However,

Art Unit: 2611

Ylitalo discloses that additional transmit diversity may be obtained by increasing the number of antennas. Furthermore; Dabak et al disclose a wireless communication system comprising a space time encoder adapted to space time code at least two pairs of symbol sub-streams comprising at least four transmit antennas. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to increase the number of antennas of Ylitalo so that additional transmit diversity may be obtained.

As per claims 2-5 and 11-13, Ylitalo discloses at least two transmit sequence chains represented by a matrix but does not disclose at least four transmit sequence chains represented by a matrix as claimed in claims 2-5 and 11-13. However, Boariu discloses a wireless communication system comprising a space time encoder adapted to space time code; at least four transmit sequence chains represented by a matrix where; each row of the matrix represents one transmit sequence of a respective different one of the transmit sequence chains; and each column of the matrix represents one symbol period. (See fig.3, 4,5 and col.5, lines 5-37; col.20, lines 58-65; col.32 lines 52-60) Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to obtain a matrix for four transmit antennas in the system of Ylitalo if the system uses more than two antennas.

5. Claims 9,15-16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylitalo in view of Bevan et al (6,891,897).

6. Ylitalo disclose all the subject matters as discussed above. Ylitalo differs from the present claimed invention in that he does not disclose a channel encoder and

mapper as claimed in claims 9 and 15-16. However; Bevan discloses a system comprising a space-time encoder; a channel encoder; a mapper and a plurality of transmit antennas. (See fig.5). Ylitalo and Bevan are analogous art because they are from the same filed of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the channel encoder and mapper disclosed by Bevan with the space-time encoder circuit disclosed by Ylitalo. The motivation/suggestion for doing so would have been to improve the performance of the space-time coding circuit and overall to the diversity transmitter system of Ylitalo.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Temesghen Ghebretinsae whose telephone number is 571-272-3017. The examiner can normally be reached on Monday-Friday from 8 to 6. The examiner can also be reached on alternate.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel, can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 2611

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

T.Ghebretinsae

10/10/06.

Temesghen Ghebretinsae  
Primary Examiner  
Art Unit 2611

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PRIMARY EXAMINER  
10/10/06